CDPHE Community Level Estimates: 2012-2015 Model Validations

QUESTION: Are the Number of CO-BRFSS respondents per county representative of each county's population?

• BRFSS 2012-2015 Respondents; sampling strategy is the national standard implemented by all participating states

• **52,840** Individual BRFSS responses from 2012-2015 for use in small area estimation modeling

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Colorado Counties: Percent of Colorado Population vs. Percent of 2012-2015 CO-BRFSS Responses

County	Pop (% of CO)	BRFSS Responses (% of Total)	County	Pop (% of CO)	BRFSS Responses (% of Total)	County	Pop (% of CO)	BRFSS Responses (% of Total)
Adams	8.37%	7.2%	Fremont	0.98%	1.7%	Morgan	0.52%	1.1%
Alamosa	0.31%	0.8%	Garfield	1.05%	1.2%	Otero	0.36%	0.9%
Arapahoe	11.29%	8.7%	Gilpin	0.11%	0.2%	Ouray	0.10%	0.2%
Archuleta	0.25%	0.5%	Grand	0.29%	0.4%	Park	0.34%	0.8%
Baca	0.07%	0.2%	Gunnison	0.32%	0.5%	Phillips	0.08%	0.3%
Bent	0.13%	0.2%	Hinsdale	0.02%	0.1%	Pitkin	0.36%	0.4%
Boulder	6.11%	4.6%	Huerfano	0.14%	0.4%	Prowers	0.23%	0.5%
Broomfield	1.11%	0.8%	Jackson	0.03%	0.1%	Pueblo	3.09%	3.2%
Chaffee	0.38%	0.9%	Jefferson	10.82%	9.1%	Rio Blanco	0.13%	0.5%
Cheyenne	0.04%	0.2%	Kiowa	0.03%	0.1%	Rio Grande	0.23%	0.7%
Clear Creek	0.19%	0.3%	Kit Carson	0.16%	0.7%	Routt	0.47%	1.2%
Conejos	0.15%	0.6%	La Plata	0.14%	1.7%	Saguache	0.12%	0.4%
Costilla	0.07%	0.2%	Lake	1.06%	0.2%	San Juan	0.01%	0.0%
Crowley	0.12%	0.1%	Larimer	6.22%	5.3%	San Miguel	0.16%	0.2%
Custer	0.09%	0.2%	Las Animas	0.30%	0.7%	Sedgwick	0.05%	0.1%
Delta	0.60%	1.1%	Lincoln	0.11%	0.4%	Summit	0.60%	0.6%
Denver	12.62%	9.1%	Logan	0.46%	0.9%	Teller	0.47%	1.0%
Dolores	0.04%	0.1%	Mesa	2.87%	3.5%	Washington	0.09%	0.2%
Douglas	5.34%	4.5%	Mineral	0.02%	0.1%	Weld	4.87%	4.9%
Eagle	1.01%	1.1%	Moffat	0.25%	0.9%	Yuma	0.19%	0.5%
El Paso	12.12%	9.0%	Montezuma	0.50%	0.9%			
Elbert	0.45%	1.4%	Montrose	0.007%	0.01%			

Greatest difference
Least difference

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Colorado Counties: Percent of Colorado Population vs. Percent of 2012-2015 BRFSS Responses, by Race/Ethnicity

County	Pop., White (%)	White BRFSS Responses (%)	Pop., Black (%)	Black BRFSS Responses (%)	Pop., Hisp. (%)	Hispanic BRFSS Responses (%)	Pop., Other (%)	Other BRFSS Responses (%)
Adams	83.2%	65.3%	3.0%	2.6%	25.6%	15.4%	9.0%	10.3%
Alamosa	85.0%	62.1%	1.6%	0.7%	31.8%	15.2%	10.3%	13.0%
Arapahoe	76.4%	70.4%	9.6%	7.8%	9.3%	7.6%	8.1%	8.6%
Archuleta	88.2%	82.0%	0.7%	1.1%	8.1%	4.3%	7.6%	4.0%
Baca	96.1%	85.5%	1.5%	0.0%	6.7%	3.4%	1.4%	4.3%
Bent	78.1%	69.5%	14.5%	0.0%	26.3%	11.5%	3.2%	12.2%
Boulder	89.2%	81.8%	0.9%	0.7%	7.4%	6.2%	5.3%	7.0%
Broomfield	88.5%	82.1%	1.0%	0.2%	7.4%	4.9%	4.1%	7.5%
Chaffee	93.7%	86.7%	2.4%	0.0%	7.5%	2.8%	2.6%	4.4%
Cheyenne	97.7%	88.9%	0.4%	0.0%	12.8%	4.4%	0.8%	3.3%
Clear Creek	95.5%	89.7%	1.4%	0.5%	3.1%	1.1%	1.7%	4.3%
Conejos	89.8%	50.0%	0.1%	0.0%	47.4%	20.1%	8.4%	17.7%
Costilla	88.7%	39.8%	0.0%	0.0%	55.3%	29.7%	9.5%	21.2%
Crowley	84.1%	79.0%	9.3%	0.0%	26.7%	6.5%	3.4%	8.1%
Custer	96.9%	85.7%	1.6%	0.0%	2.0%	3.4%	1.2%	3.4%
Delta	95.1%	83.8%	1.4%	0.0%	10.4%	4.1%	2.4%	5.2%
Denver	77.2%	59.9%	9.3%	9.2%	18.7%	13.0%	8.8%	11.5%
Dolores	95.3%	87.8%	0.0%	2.7%	7.6%	0.0%	3.7%	4.1%
Douglas	91.7%	86.3%	1.1%	1.0%	5.5%	3.5%	3.0%	5.0%
Eagle	9.0%	76.3%	0.1%	0.4%	1.9%	11.5%	0.7%	5.8%
El Paso	96.4%	77.8%	0.7%	4.4%	4.5%	4.5%	1.9%	7.9%
Elbert	82.8%	89.9%	5.8%	0.5%	8.3%	1.9%	8.0%	2.8%
Fremont	85.8%	85.2%	7.0%	0.6%	9.6%	2.7%	4.1%	4.8%
Garfield	90.8%	78.1%	1.0%	0.5%	16.8%	8.3%	6.9%	7.3%
Gilpin	92.7%	82.1%	0.5%	0.8%	2.8%	3.3%	6.2%	6.5%
Grand	95.2%	88.8%	0.1%	0.5%	2.9%	1.0%	2.6%	3.4%
Gunnison	96.5%	89.8%	0.6%	0.0%	6.1%	2.0%	1.0%	3.1%
Hinsdale	97.8%	93.9%	0.0%	0.0%	2.5%	3.0%	2.2%	0.0%
Huerfano	83.4%	65.5%	0.8%	0.0%	18.4%	14.3%	12.2%	11.8%
Jackson	93.5%	80.6%	0.1%	0.0%	9.1%	4.5%	4.8%	9.0%
Jefferson	92.0%	83.0%	1.0%	0.8%	10.1%	5.4%	3.6%	6.3%
Kiowa	96.1%	91.2%	1.1%	0.0%	3.0%	3.5%	2.2%	0.0%

Colorado Counties: Percent of Colorado Population vs. Percent of 2012-2015 BRFSS Responses, by Race/Ethnicity

(continued)

County	Pop., White (%)	White BRFSS Responses (%)	Pop., Black (%)	Black BRFSS Responses (%)	Pop., Hisp. (%)	Hispanic BRFSS Responses (%)	Pop., Other (%)	Other BRFSS Responses (%)
Kit Carson	91.0%	91.4%	4.4%	0.3%	14.1%	2.3%	2.1%	3.2%
La Plata	90.5%	84.1%	0.7%	0.0%	16.4%	3.0%	7.6%	7.1%
Lake	88.6%	68.3%	0.4%	0.8%	6.6%	14.2%	4.8%	5.0%
Larimer	92.1%	85.9%	0.9%	0.6%	5.8%	4.0%	4.4%	5.2%
Las Animas	85.3%	55.4%	1.2%	0.3%	28.7%	21.5%	10.6%	13.8%
Lincoln	80.8%	91.0%	14.7%	0.0%	14.4%	0.9%	2.0%	3.4%
Logan	91.7%	87.7%	1.6%	0.9%	10.9%	3.5%	3.9%	4.4%
Mesa	92.8%	83.9%	0.7%	0.6%	7.7%	3.7%	4.8%	5.2%
Mineral	95.8%	91.1%	0.8%	0.0%	0.3%	3.6%	3.3%	1.8%
Moffat	93.6%	85.4%	0.2%	0.2%	8.8%	4.8%	3.6%	4.2%
Montezuma	85.8%	82.0%	0.0%	0.0%	7.9%	4.8%	3.3%	7.8%
Montrose	92.5%	82.7%	0.7%	0.0%	11.7%	5.6%	5.4%	5.9%
Morgan	91.2%	75.2%	2.7%	0.8%	24.6%	12.2%	5.3%	6.3%
Otero	90.3%	67.8%	0.6%	0.2%	30.9%	10.9%	6.1%	12.0%
Ouray	97.5%	91.1%	0.0%	0.0%	4.3%	1.1%	2.0%	1.1%
Park	96.4%	87.8%	0.1%	0.2%	4.6%	2.0%	1.8%	5.0%
Phillips	93.7%	87.0%	0.4%	0.0%	16.9%	4.3%	4.6%	2.2%
Pitkin	95.3%	90.4%	1.9%	0.0%	7.6%	3.7%	1.4%	1.1%
Prowers	93.8%	73.9%	0.5%	0.0%	26.8%	11.2%	3.8%	8.0%
Pueblo	81.0%	64.1%	2.0%	1.3%	23.4%	15.6%	13.9%	11.7%
Rio Blanco	94.0%	86.1%	0.6%	0.0%	8.6%	3.3%	2.3%	5.5%
Rio Grande	83.0%	62.1%	0.5%	0.0%	25.4%	18.0%	14.1%	10.7%
Routt	94.8%	90.3%	0.2%	0.3%	3.3%	1.7%	3.1%	2.7%
Saguache	86.3%	69.9%	0.5%	0.0%	25.2%	11.5%	11.2%	11.0%
San Juan	94.6%	57.1%	0.0%	0.0%	19.6%	21.4%	3.7%	14.3%
San Miguel	96.4%	87.1%	0.3%	0.0%	7.6%	2.0%	1.5%	5.0%
Sedgwick	92.3%	83.6%	0.5%	0.0%	13.5%	4.5%	5.6%	6.0%
Summit	91.6%	86.0%	0.8%	0.6%	7.2%	4.4%	5.9%	2.5%
Teller	94.4%	85.4%	0.9%	1.0%	3.3%	2.7%	3.1%	4.9%
Washington	96.6%	92.4%	1.3%	0.0%	6.6%	2.3%	1.7%	3.1%
Weld	88.3%	75.1%	1.0%	0.3%	16.9%	10.5%	8.5%	7.8%
Yuma	92.6%	83.8%	0.1%	0.0%	10.4%	6.5%	7.0%	3.2%

QUESTION: How do the Community Level Estimates compare to the BRFSS County-Level Direct Estimates?

- In order to compare these prevalence estimates at the same geographic level, we aggregated all census tract-level estimates within the same county, taking the arithmetic mean.

Correlations: CO-BRFSS Direct County Estimates & Community Level Estimates

(County Avg.)

BRFSS Direct Estimate	CLE Estimate (County Average)	
	Coefficient	alpha
Asthma	0.89222	<0.0001
Binge	0.85294	<0.0001
Cigarette Smoking	0.87991	<0.0001
Delayed Care	0.46603	0.0001
Diabetes	0.86027	<0.0001
Fair/Poor Health Status	0.89589	<0.0001
Heart Disease	0.77842	<0.0001
Heavy Drinking	0.88963	<0.0001
Mental Distress	0.82002	<0.0001
No Checkup 12 Months	0.79384	<0.0001
No Physical Activity	0.94023	<0.0001
Obesity	0.92998	<0.0001
Overweight	0.92655	<0.0001
Physical Distress	0.90606	<0.0001

BRFSS Direct County – Level Estimates and the Community Level Estimates are highly correlated

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Obesity Prevalence Estimates: % Difference, CLEs (County Avg). vs. CO-BRFSS Direct
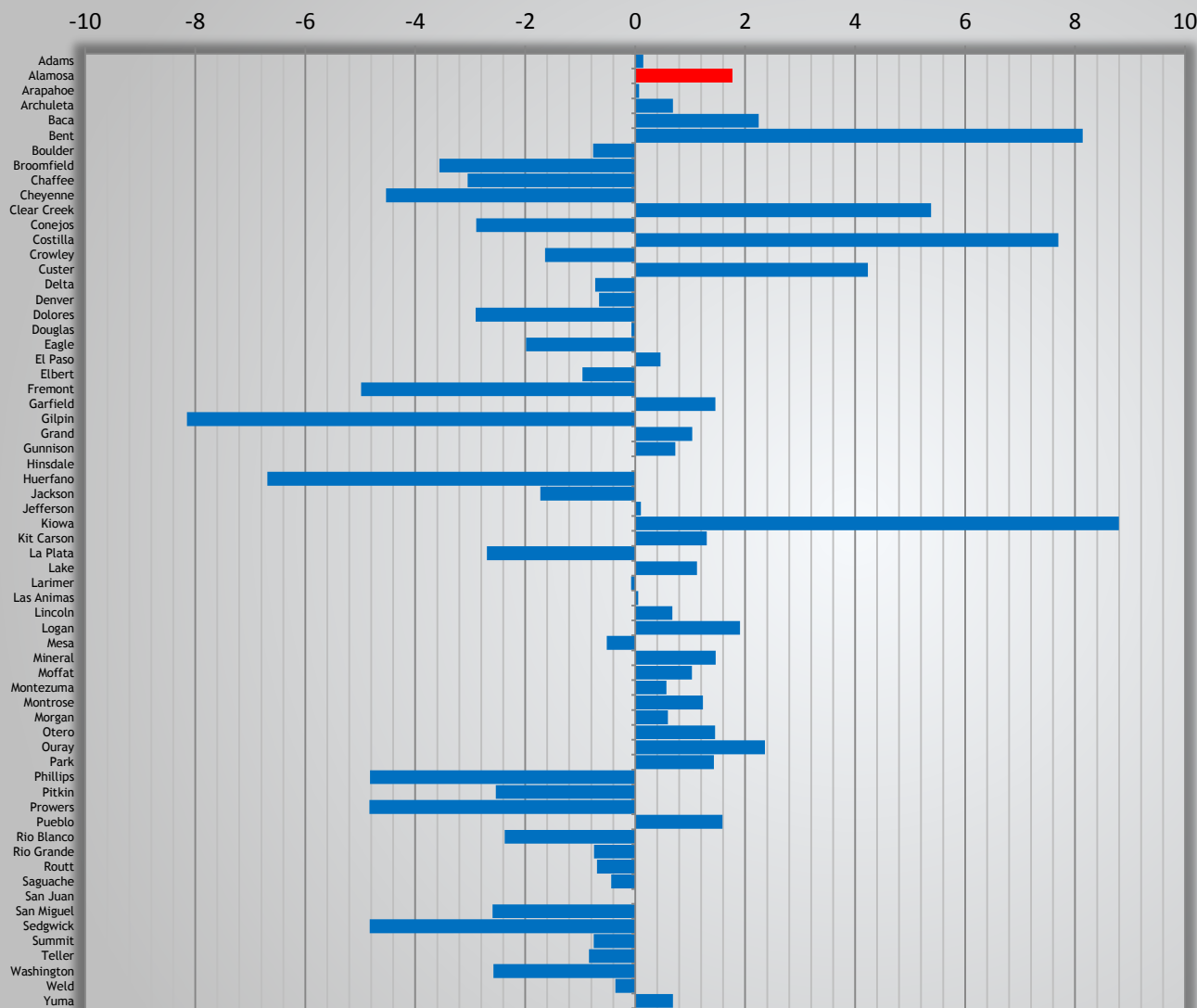
Obesity: BRFSS Direct Estimate and CLE County Average, Prevalence (%) Difference vs. County BRFSS Sample Size
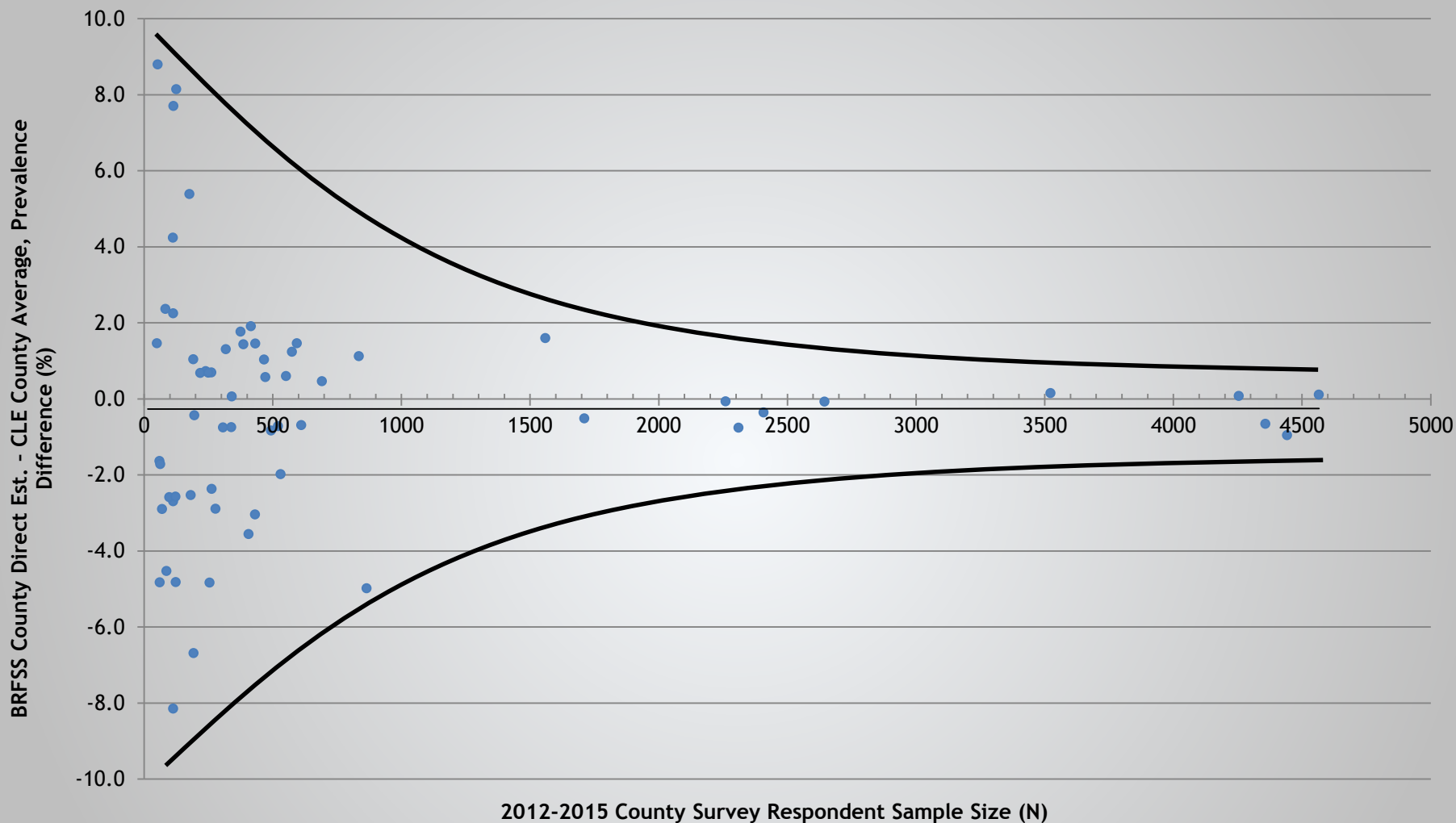
The more CO-BRFSS respondents per county, the closer the CLE Avg. approximates CO-BRFSS Direct Estimate

QUESTION: How do various weighting schemes of the CO-BRFSS respondents affect the community level modeled estimates?

Comparing estimate outputs and weight statements in the PROC GLIMMIX Model for the indicators with most/least missing BRFSS respondents

Weight Options in the model for respondents were:
- No Weight
- Sub-State (region) Weight
- State Weight

Read more about the weight structure, implemented since 2011 here:
https://www.cohealthdata.dphe.state.co.us/chd/Resources/pubs/BRFSS%20Fact%20Sheet.pdf

Differences in Prevalence Estimates (%)
Using Three Separate PROC GLIMMIX Model Weights

Diabetes (Indicator w/ Least # of Missing BRFSS Reponses)

	State Weight vs. Sub-State Weight	Sub-State Weight vs. No Weight	State Weight vs. No Weight
Mean Difference	0.06%	0.27%	0.33%
Median Difference	0.6%	-0.26%	-0.07%
Mode	0.00%	0.00%	0.00%
SD	0.43%	4.38%	4.25%
MIN	-5.11%	-19.50%	-19.54%
MAX	1.11%	17.79%	16.76%

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Differences in Prevalence Estimates (%)
Using Three Separate PROC GLIMMIX Model Weights

Heavy Drinking (Indicator w/Most # of Missing BRFSS Reponses)

	State Weight vs. Sub-State Weight	Sub-State Weight vs. No Weight	State Weight vs. No Weight
Mean Difference	0.07%	0.07%	0.00%
Median Difference	0.10%	0.10%	0.00%
Mode	0.00%	0.00%	0.00%
SD	0.43%	0.43%	0.00%
MIN	-4.64%	-4.64%	0.00%
MAX	3.70%	3.70%	0.00%

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QUESTION: How do the Community Level Estimates compare to other health surveys and estimations?

We looked at how the CLE compared to the following external health surveys and estimation techniques:

- Weld County Community Health Survey (2013)

- Health District of Northern Larimer County (2013)

- Gallup Well Being Index (2013-2015)

- CDC/RWJF 500 Cities (2011)

- Denver CHORDS Electronic Health Record Data (2012-2015)

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Validations with
External Community Health Surveys:

Weld County Community Health Survey (2013)
https://www.weldgov.com/departments/health_and_environment/data_statistics/2013_community_health_survey_results/
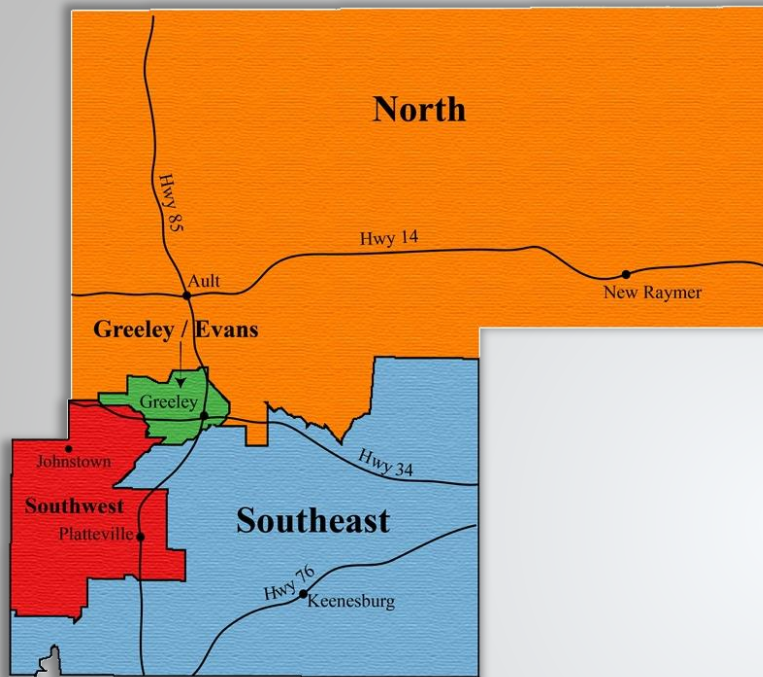
Weld County Community Health Survey 2013 Region Boundaries
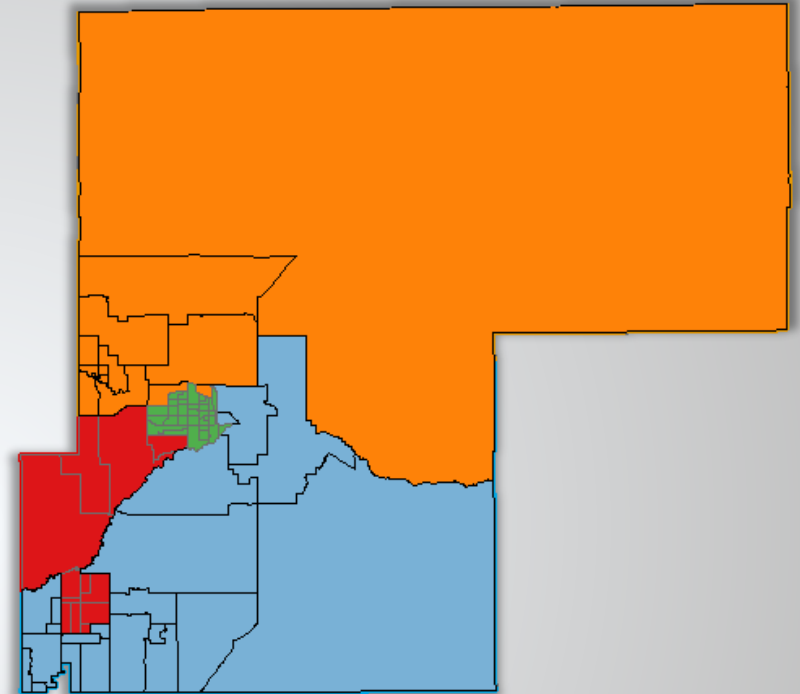
Coding Census Tracts to the analogous external survey regions based on having their centroid in red, blue, and orange regions. Manual selection of those that do not have centroid in any other region as green.

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Key Indicator Comparisons:

Weld Survey Regions	Delayed Care			Asthma†			Diabetes*			CHF*			Obesity (BMI >=30)			Cigarette Smoking†		
	Est.	95%CI	95%CI	Est.	95%CI	95%CI	Est.	95%CI	95%CI	Est.	95%CI	95%CI	Est.	95%CI	95%CI	Est.	95%CI	95%CI
North	24.3%	19.3%	29.30%	6.8%	1.8%	11.8%	6.3%	1.3%	11.3%	1.3%	0.0%	6.3%	23.6%	18.6%	28.6%	10.4%	5.4%	15.4%
Greeley/Evans	34.1%	29.1%	39.10%	13.0%	8.0%	18.0%	10.2%	5.2%	15.2%	1.5%	0.0%	6.5%	35.1%	30.1%	40.1%	17.4%	12.4%	22.4%
Southwest	30.1%	25.1%	35.10%	11.3%	6.3%	16.3%	9.1%	4.1%	14.1%	2.0%	0.0%	7.0%	25.2%	20.2%	30.2%	8.6%	3.6%	13.6%
Southeast	22.8%	17.8%	27.80%	7.8%	2.8%	12.8%	8.5%	3.5%	13.5%	1.3%	0.0%	6.3%	25.0%	20.0%	30.0%	10.7%	5.7%	15.7%
Weld County	29.6%	27.1%	32.10%	10.5%	8.0%	13.0%	8.9%	6.4%	11.4%	1.5%	0.0%	4.0%	29.0%	26.5%	31.5%	13.4%	10.9%	15.9%
Analogous CDPHE CLE Census Tracts																		
North	12.3%	12.1%	12.5%	9.0%	8.8%	9.2%	6.6%	6.2%	6.9%	2.9%	2.7%	3.1%	26.3%	25.9%	26.7%	19.4%	18.8%	20.1%
Greeley/Evans	15.2%	14.4%	16.0%	9.0%	8.8%	9.3%	6.6%	6.1%	7.1%	2.8%	2.5%	3.1%	27.3%	26.6%	28.0%	17.7%	17.2%	18.1%
Southwest	13.2%	12.5%	14.0%	9.1%	8.9%	9.3%	6.7%	6.2%	7.1%	2.7%	2.3%	3.1%	27.1%	26.8%	27.5%	19.4%	18.8%	19.9%
Southeast	14.2%	13.6%	14.7%	9.5%	9.1%	9.8%	7.4%	6.9%	7.9%	2.9%	2.7%	3.2%	28.1%	27.5%	28.7%	18.7%	18.2%	19.3%
Weld County	14.2%	13.8%	14.7%	9.2%	9.0%	9.3%	6.8%	6.5%	7.1%	2.8%	2.7%	3.0%	27.4%	27.0%	27.7%	18.4%	18.1%	18.8%

*Told by a healthcare provider
† Currently have condition
"County Estimates CHS 2013 95% CI +/- 2.5% Regional CHS 2013 95% CI +/- 5.0%"
https://www.weldgov.com/departments/health_and_environment/data_statistics/2013_community_health_survey_results/

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Validations with
External Community Health Surveys:

Health District of Northern Larimer County
Community Health Assessment (2013)
http://www.healthdistrict.org/2013-community-health-assessment
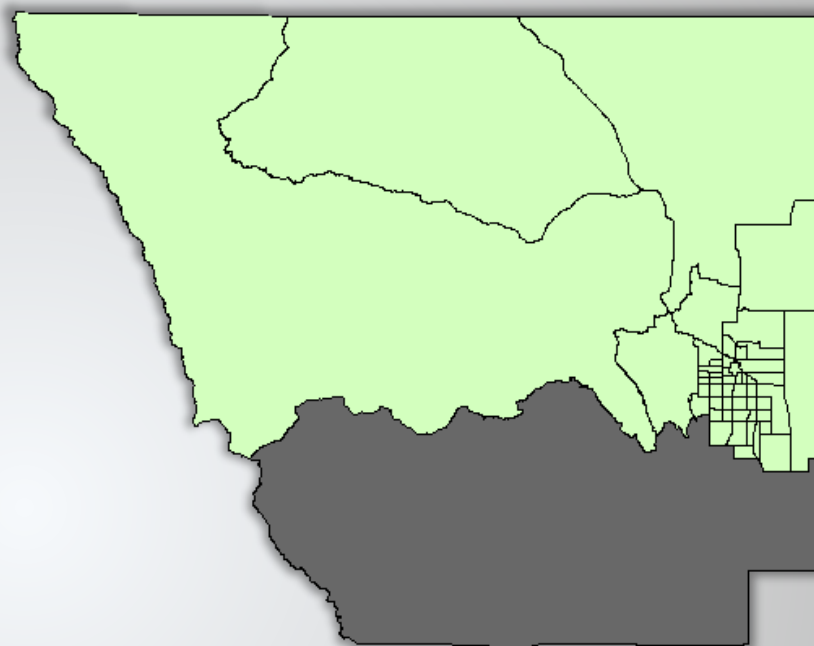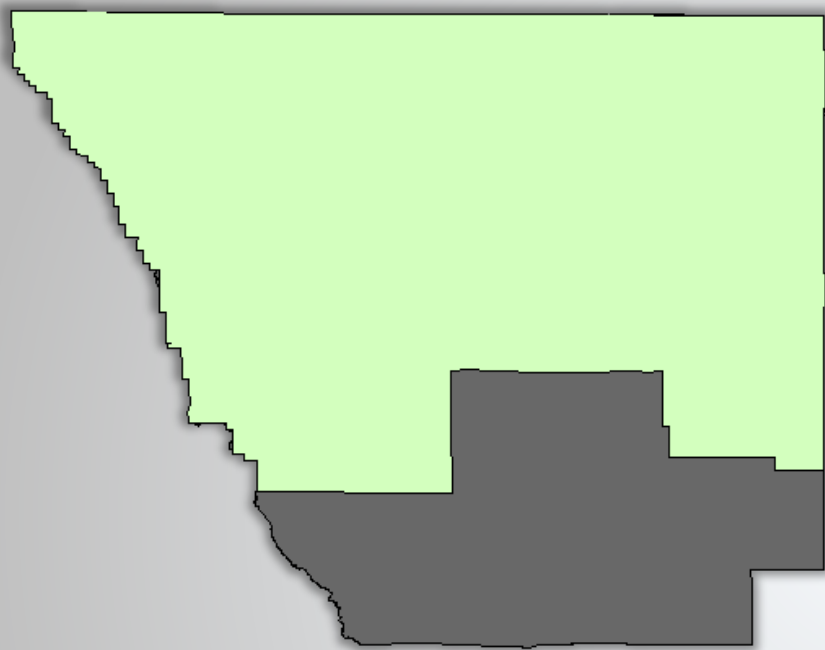
Coding Census Tracts to the analogous external survey region based on having their centroid within the HDoNLC boundary

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Key Indicator Comparisons:

	Health District Community Health Assessment (2013)			CDPHE CLE Average (within Health Dist.)
	Est.	95% CI	95% CI	Mean Est.
Adult Smoking Prevalence	9.0%	6.7%	11.3%	14.4%
Adult Diabetes Prevalence	4.0%	1.7%	6.3%	4.4%
Mental Health Problems	20.0%	17.7%	22.3%	9.0%
Binge Drinking	26.0%	23.7%	28.3%	22.2%
Obese	16.0%	13.7%	18.3%	17.3%
Overweight or Obese	32.0%	29.7%	34.3%	49.9%

RED = CDPHE's CLE 95% CI is higher than reference dataset's 95% CI
BLUE = CDPHE's CLE 95% CI is lower than reference dataset's 95% CI

"Confidence intervals within the health district are +/- 2.32%" , WYSAC Technical Report No. SRC-1403
http://www.healthdistrict.org/2013-community-health-assessment /

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City of Boulder obesity prevalence reported as 12.4% (2012-2013)

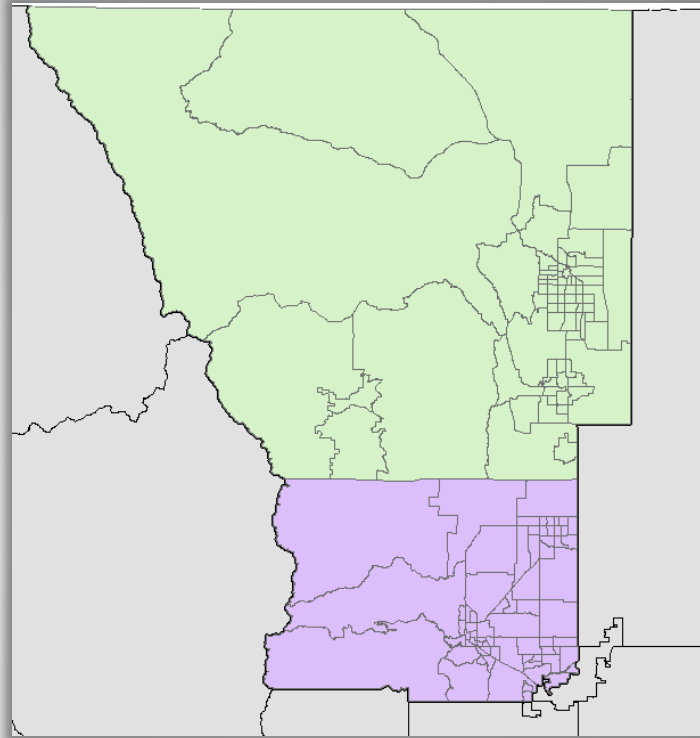Fort Collins – Loveland CO obesity prevalence reported at 18.2% (2012-2013)

"Gallup and Healthways track U.S. obesity levels as part of the [Gallup-Healthways Well-Being Index](), using Americans' self-reported height and weight to calculate Body Mass Index (BMI) scores. BMI scores of 30 or higher are considered obese. Gallup interviewed at least 300 adults aged 18 and older in each of 189 MSAs. Each MSA sample is weighted to match the demographic characteristics of that area. Gallup categorizes U.S. metro areas according to the U.S. Office of Management and Budget's definitions for Metropolitan Statistical Areas (MSAs)."

"Maximum expected error ranges for the Well-Being Index and the sub-index scores vary according to MSA size, ranging from less than 1 point for the largest cities represented to ±1.5 points for the smallest cities."

http://www.gallup.com/poll/168230/boulder-colo-residents-least-likely-obese.aspx

Fort Collins/Loveland and Boulder MSAs (2012-2013)

*Tracts selected based on centroid within OMB Statistical area boundaries

http://www.healthways.com/wbi-thank-you?submissionGuid=86422cbb-29e0-4e2d-b388-606cfc6106b4

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External Survey Validation:
Boulder and Fort Collins/Loveland (2012-2015)

	City of Boulder MSA Gallup · Healthways Well-Being Index®			City of Boulder MSA(CLEs) (68 Tracts)
	Est.	95% CI	95%CI	Mean Est.
Obesity	12.4%	10.9%	13.9%	13.6%
Smoking	12.3%	10.8%	13.8%	12.4%
Diabetes	4.9%	3.4%	6.4%	3.8%

Fort Collins/ Loveland MSA Gallup · Healthways Well-Being Index®				Fort Collins/Loveland MSA (CLEs) (73 Tracts)
Mean Est.	95% CI	95%CI		Mean Est.
18.2%	16.7%	19.7%		17.5%
16.9%	15.4%	18.4%		14.1%
6.5%	5.0%	8.0%		4.7%

RED = CDPHE's SAE 95% CI is higher than reference dataset's 95% CI
BLUE = CDPHE's SAE 95% CI is lower than reference dataset's 95% CI

*Tracts selected based on centroid within OMB Statistical area boundaries. Some census tracts omitted.

"Maximum expected error ranges for the Well-Being Index and the sub-index scores vary according to MSA size, ranging from less than 1 point for the largest cities represented to ±1.5 points for the smallest cities."

http://www.gallup.com/poll/145913/City-Wellbeing-Tracking.aspx

http://www.healthways.com/wbi-thank-you?submissionGuid=86422cbb-29e0-4e2d-b388-606cfc6106b4

City of Colorado Springs obesity prevalence reported as 19.6% (2014)

"Gallup and Healthways track U.S. obesity levels as part of the [Gallup-Healthways Well-Being Index](), using Americans' self-reported height and weight to calculate Body Mass Index (BMI) scores. BMI scores of 30 or higher are considered obese. Gallup interviewed at least 300 adults aged 18 and older in each of 189 MSAs. Each MSA sample is weighted to match the demographic characteristics of that area. Gallup categorizes U.S. metro areas according to the U.S. Office of Management and Budget's definitions for Metropolitan Statistical Areas (MSAs)."

"Maximum expected error ranges for the Well-Being Index and the sub-index scores vary according to MSA size, ranging from less than 1 point for the largest cities represented to ±1.5 points for the smallest cities."

Source: http://www.gallup.com/poll/183257/colorado-springs-residents-least-likely-obese.aspx

Colorado Springs MSA (2013-2015)
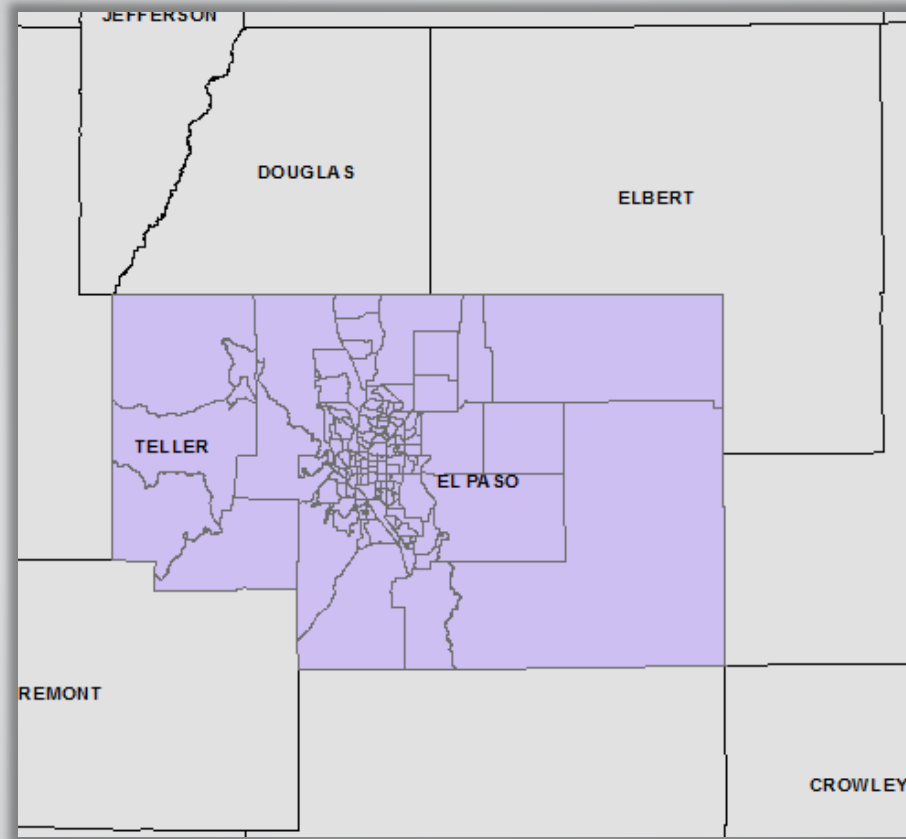
*Tracts selected based on centroid within OMB Statistical area boundaries

External Survey Validation Colorado Springs (2013-2015)

Colorado Springs MSA

Gallup · Healthways
Well-Being Index®

Colorado Springs MSA (CLEs) (136 Tracts)

	Est.	95% CI	95%CI	Mean Est.
Obesity	20.3%	*18.8%*	*21.8%*	**22.9%**
Smoking	21.4%	*19.9%*	*22.9%*	**18.6%**
Diabetes	8.7%	*7.2%*	*10.2%*	7.5%

RED = CDPHE's SAE 95% CI is higher than reference dataset's 95% CI
BLUE = CDPHE's SAE 95% CI is lower than reference dataset's 95% CI

*Tracts selected based on centroid within OMB Statistical area boundaries

"Maximum expected error ranges for the Well-Being Index and the sub-index scores vary according to MSA size, ranging from less than 1 point for the largest cities represented to ±1.5 points for the smallest cities."

External Survey Validation:500 Cities

https://www.cdc.gov/500cities/

500 Cities and CDPHE CLE: Tract- Level Correlation

Census Tract Level

	Coefficient	p value
Asthma	**0.05262**	**0.1692**
Mental Health	0.38716	<0.0001
Smoking	0.50987	<0.0001
No Physical Activity	0.71878	<0.0001
Diabetes	0.74008	<0.0001
Binge Drinking	0.76233	<0.0001
Obesity	0.80168	<0.0001

Exploring Asthma (least correlated)

Simple Statistics							
Variable	N	Mean	Std Dev	Sum	Minimum	Maximum	Label
CASTHMA_CrudePrev	684	8.74415	0.93787	5981	6.90000	14.90000	CASTHMA_CrudePrev
Asthma_Census_Tract_Estimate	684	8.92573	1.35732	6105	5.80000	16.80000	Asthma_Census_Tract_Estimate

Asthma- 500Cities

Asthma- CDPHE CLE

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CDPHE CLEs and 500 Cities: Overall Census Tract Level Difference* In Estimated Crude Prevalence (%)

500 Cites/CLE Difference	Obesity	Diabetes	Binge Drinking	Smoking	Asthma	Mental Distress
Average	-1.1%	-0.2%	1.4%	0.3%	0.2%	-0.5%
Median	-1.1%	-0.3%	0.7%	0.5%	0.2%	-0.3%
Std. Dev	3.0%	1.8%	3.3%	4.0%	1.6%	2.4%
Minimum	-15.1%	-7.3%	-8.8%	-21.2%	-4.6%	-12.1%
Maximum	12.2%	5.4%	11.5%	10.1%	9.2%	5.7%

*Calculated by subtracting the 500Cities crude prevalence estimate from the CDPHE CLE prevalence estimate

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500 Cities: Crude Prevalence, City-Level

City	Tracts (N)	Binge drinking prevalence among adults aged >=18 years			Current smoking among adults aged >=18 years			No leisure-time physical activity among adults aged >=18 years			Obesity among adults aged >=18 years			Current asthma prevalence among adults aged >=18 years			Diagnosed diabetes among adults aged >=18 years			Mental health not good for >=14 days among adults aged >=18 years		
		Crude Est.	Crude L95% CI	Crude H95% CI	Crude Est.	Crude L95% CI	Crude H95% CI	Crude Est.	Crude L95% CI	Crude H95% CI	Crude Est.	Crude L95% CI	Crude H95% CI	Crude Est.	Crude L95% CI	Crude H95% CI	Crude Est.	Crude L95% CI	Crude H95% CI	Crude Est.	Crude L95% CI	Crude H95% CI
Boulder	30	20.3%	20%	20.5%	12.7%	11.8%	13.5%	10.8%	10.3%	11.2%	14.9%	14.6%	15.1%	9%	8.8%	9.2%	4.1%	4%	4.1%	9.4%	9%	9.8%
Arvada	39	19%	18.9%	19.2%	16.3%	15.8%	16.8%	14.9%	14.5%	15.3%	20.5%	20.3%	20.7%	8.5%	8.4%	8.6%	6.6%	6.5%	6.8%	9.3%	9.1%	9.5%
Aurora	95	17.3%	17.3%	17.4%	19%	18.7%	19.2%	19.5%	19.3%	19.8%	26%	25.9%	26.1%	9.1%	9.1%	9.2%	7.9%	7.8%	8%	11.2%	11.1%	11.3%
Centennial	42	18.3%	18.2%	18.5%	12.6%	12.1%	13.1%	12.6%	12.2%	13%	20.2%	19.9%	20.5%	7.8%	7.7%	7.9%	6.2%	6%	6.3%	7.9%	7.7%	8.2%
Colo. Springs	110	15.5%	15.4%	15.6%	17.5%	17.2%	17.7%	16.9%	16.7%	17.1%	23.3%	23.1%	23.4%	8.5%	8.5%	8.6%	7%	7%	7.1%	10.1%	10%	10.3%
Denver	144	21.3%	21.2%	21.3%	17.7%	17.4%	17.9%	16.1%	16%	16.3%	19.4%	19.3%	19.5%	8.8%	8.8%	8.9%	6.9%	6.9%	7%	10.3%	10.2%	10.4%
Fort Collins	47	20.2%	20%	20.4%	15.4%	14.8%	15.9%	13.6%	13.2%	14%	18.7%	18.4%	18.9%	9.1%	9%	9.2%	4.8%	4.7%	4.9%	9.9%	9.7%	10.2%
Greeley	39	17.1%	16.9%	17.2%	18.6%	18%	19.2%	21.3%	20.8%	21.8%	25.5%	25.2%	25.7%	9.2%	9%	9.3%	7.2%	7.1%	7.3%	11.6%	11.3%	11.9%
Lakewood	50	18.7%	18.6%	18.8%	16.5%	16.1%	17%	16%	15.7%	16.3%	20.8%	20.6%	21%	8.6%	8.5%	8.7%	6.9%	6.8%	7%	9.6%	9.4%	9.8%
Longmont	22	17.3%	17.2%	17.5%	14.8%	14.2%	15.3%	14.9%	14.4%	15.4%	18.6%	18.3%	18.8%	8.9%	8.8%	9.1%	6.6%	6.5%	6.7%	10.1%	9.8%	10.4%
Loveland	17	17.7%	17.5%	17.9%	15.4%	14.6%	16.1%	15.6%	15%	16.2%	20.3%	20%	20.6%	8.8%	8.6%	8.9%	6.7%	6.6%	6.9%	9.5%	9.2%	9.8%
Pueblo	43	13.7%	13.6%	13.8%	19.6%	19.2%	20%	24.4%	24%	24.8%	29.9%	29.7%	30.1%	9%	8.9%	9.1%	10.6%	10.5%	10.7%	11.7%	11.5%	11.9%
Thornton	39	19.1%	18.9%	19.2%	19.7%	19.1%	20.2%	17.4%	17%	17.7%	25.4%	25.2%	25.6%	8.7%	8.6%	8.8%	6.4%	6.4%	6.5%	10.4%	10.2%	10.6%
Westminster	38	19.4%	19.3%	19.6%	17.7%	17.1%	18.2%	15.7%	15.3%	16.1%	22.5%	22.3%	22.7%	8.5%	8.4%	8.6%	6.3%	6.2%	6.4%	9.7%	9.4%	9.9%

The 500 Cities Project: Local data for better health

Source: https://www.cdc.gov/500cities/map-books.htm#ui-id-11

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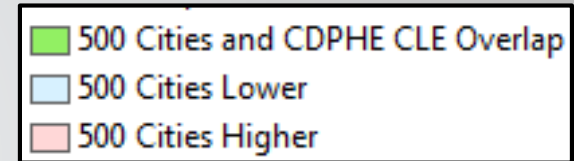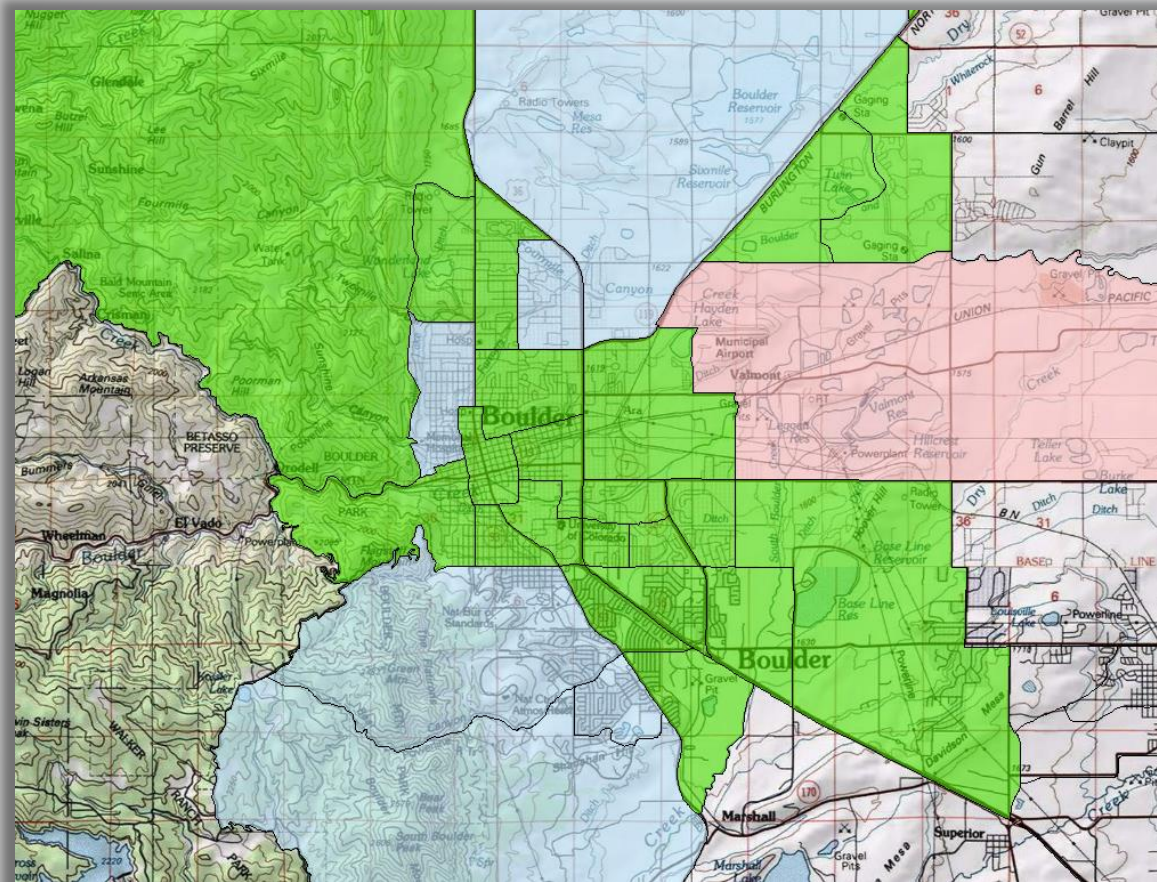# CDPHE CLEs, City-Level Aggregated Estimates

City	Tracts (N)	Binge drinking prevalence among adults aged >=18 years			Current smoking among adults aged >=18 years			No leisure-time physical activity among adults aged >=18 years			Obesity among adults aged >=18 years			Current asthma prevalence among adults aged >=18 years			Diagnosed diabetes among adults aged >=18 years			Mental health not good for >=14 days among adults aged >=18 years		
		Est.	L95%CI	H95%CI	Est.	L95%CI	H95%CI	Est.	L95%CI	H95%CI	Est.	L95%CI	H95%CI	Est.	L95%CI	H95%CI	Est.	L95%CI	H95%CI	Est.	L95%CI	H95%CI
Boulder	30	20.4	18.9	22.0	12.7	12.2	13.2	9.0	8.7	9.4	13.1	12.7	13.5	8.7	8.4	9.0	3.3	2.9	3.6	8.4	7.9	9.0
Arvada	39	18.2	17.8	18.5	15.0	14.5	15.4	13.5	12.8	14.3	19.2	18.8	19.7	9.3	9.2	9.4	5.3	5.0	5.6	8.2	8.0	8.4
Aurora	95	18.9	18.5	19.3	17.1	16.6	17.5	20.3	19.7	20.9	22.3	22.0	22.7	9.7	9.5	9.8	6.5	6.2	6.8	8.9	8.8	9.1
Centennial	42	19.0	18.5	19.5	16.1	15.8	16.4	17.0	16.7	17.2	21.1	20.8	21.5	9.4	9.2	9.5	6.2	5.9	6.4	8.6	8.4	8.8
Colo. Springs	110	14.1	13.9	14.4	18.4	18.2	18.6	17.4	17.3	17.6	23.1	22.9	23.3	8.0	7.9	8.1	7.6	7.4	7.8	11.3	11.1	11.5
Denver	144	26.2	25.4	27.1	18.7	18.3	19.1	16.2	15.4	16.9	17.8	17.2	18.4	8.0	7.8	8.2	7.0	6.7	7.4	9.5	9.3	9.7
Fort Collins	47	22.7	21.5	24.0	14.7	14.3	15.0	14.3	13.9	14.7	17.2	16.8	17.5	8.0	7.9	8.2	4.2	3.8	4.6	9.0	8.8	9.2
Greeley	39	16.5	15.9	17.2	17.7	17.3	18.2	21.1	20.6	21.7	27.3	26.6	27.9	9.1	8.8	9.3	6.7	6.3	7.2	8.7	8.5	9.0
Lakewood	50	17.6	16.5	18.7	14.4	13.6	15.3	12.8	12.0	13.6	18.1	17.0	19.2	8.9	8.4	9.4	5.0	4.6	5.4	7.8	7.4	8.3
Longmont	22	17.2	16.5	17.8	12.6	11.7	13.4	12.4	11.2	13.7	15.7	14.1	17.2	7.9	7.7	8.2	4.6	4.2	5.0	7.8	7.5	8.0
Loveland	17	18.8	18.0	19.5	13.5	13.1	13.8	14.9	14.7	15.1	18.0	17.7	18.3	8.1	8.0	8.2	5.5	5.3	5.8	8.5	8.3	8.7
Pueblo	43	15.8	15.2	16.5	23.2	22.8	23.6	22.3	21.7	22.9	31.7	30.9	32.5	12.9	12.5	13.3	13.2	12.5	13.8	13.7	13.4	14.0
Thornton	39	19.2	18.8	19.7	21.0	20.6	21.5	22.7	22.1	23.3	26.2	25.8	26.6	9.6	9.4	9.8	8.3	7.9	8.7	7.1	6.3	7.8
Westminster	38	19.1	18.6	19.6	18.7	17.7	19.6	18.5	16.9	20.2	22.9	21.6	24.1	9.5	9.3	9.6	10.9	10.7	11.1	9.9	9.5	10.4

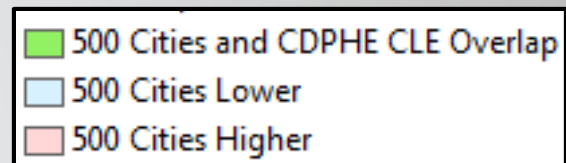**BLUE = 500 Cities statistically lower than CDPHE CLEs**
RED = 500 Cities statistically higher than CDPHE CLEs
GREEN = 500 Cities and CDPHE CLEs overlap

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Community Level Estimates vs. 500 Cities: Adult Cigarette Smoking (Boulder)

Community Level Estimates vs. 500 Cities: Adult Cigarette Smoking (Denver)

500 Cities and CDPHE CLE Overlap
500 Cities Lower
500 Cities Higher

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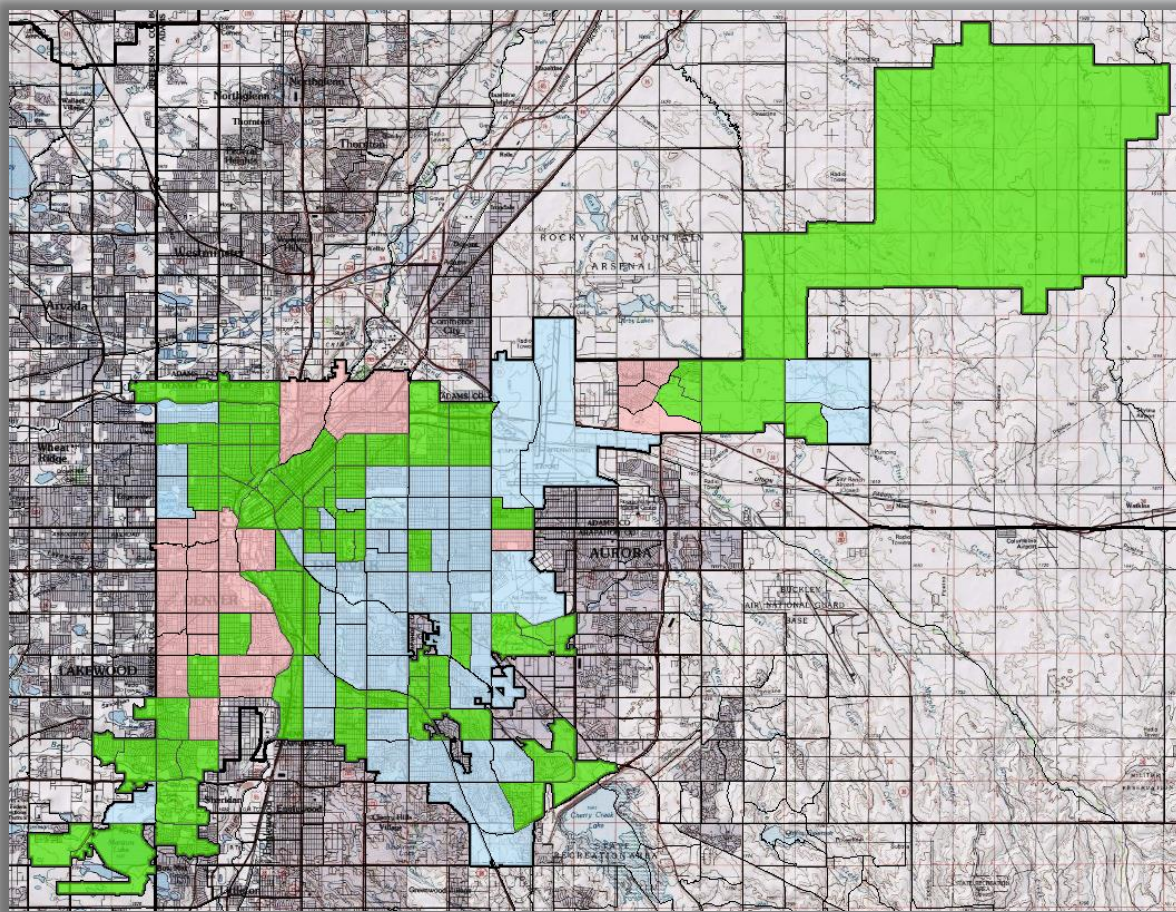
Community Level Estimates vs. 500 Cities: Adult Cigarette Smoking (Fort Collins)

Legend:
- 500 Cities and CDPHE CLE Overlap
- 500 Cities Lower
- 500 Cities Higher
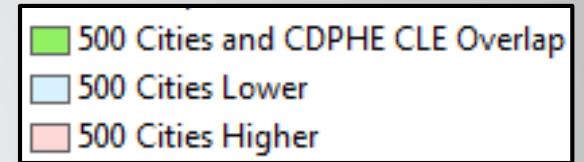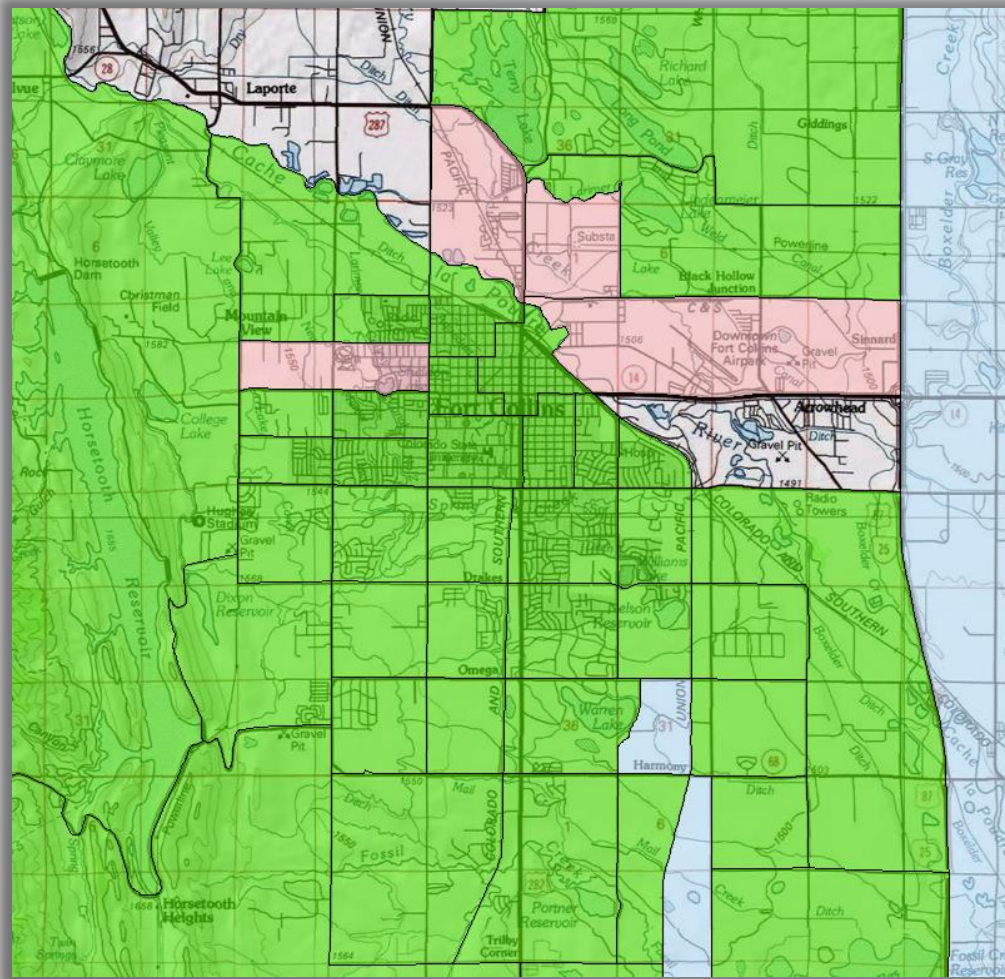
Obesity: CDPHE CLEs vs.
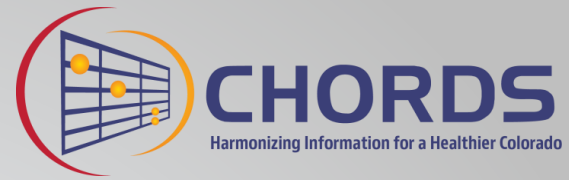
CHORDS estimates are derived from patient Electronic Health Record (EHR) data collected at time of health care visit. The prevalence estimates for each census tract in CHORDS is the prevalence in the total patient population, not the total tract population. The patient population of CHORDS is also seeking care for health outcomes, which can partially explain the overall higher prevalence we see in CHORDS estimates. Still, comparisons of the patterns of neighborhood high and low prevalence can be used to compare these two datasets, which compliment each other and help paint a full picture of public health in Denver.
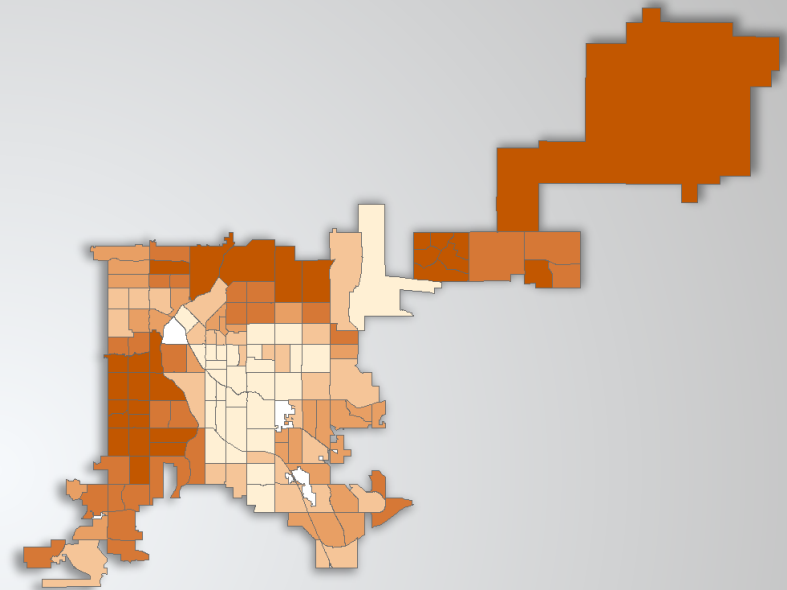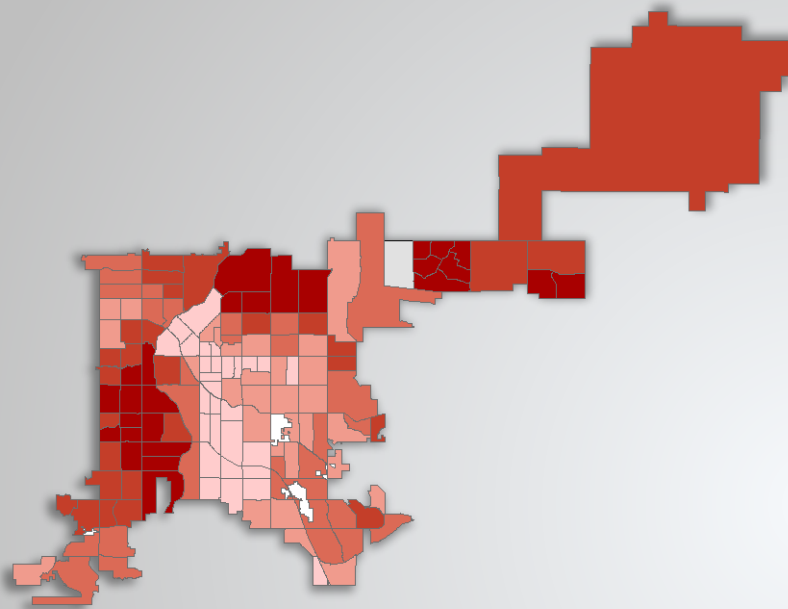
Learn more about CHORDS

http://denverpublichealth.org/home/health-information-and-reports/data-and-informatics-tools/colorado-health-observation-regional-data-service-chords
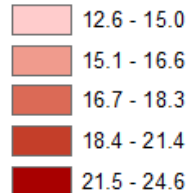
Obesity: CDPHE CLEs vs.

Small Area Estimates
Adult Obesity Prevalence, 2012- 2015

- 12.6 - 15.0
- 15.1 - 16.6
- 16.7 - 18.3
- 18.4 - 21.4
- 21.5 - 24.6

CHORDS
Adult Obesity Prevalence, 2012-2014

- 11.9 - 19.8
- 19.9 - 26.5
- 26.6 - 32.2
- 32.3 - 38.1
- 38.2 - 44.8
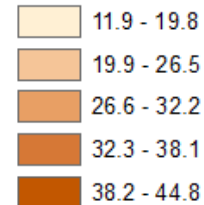
Questions?

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